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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/919,186	07/30/2001	David R. Tarditi	MS137774.1/40062.127US01	2620

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EXAMINER

EHICHIOYA, FRED I

ART UNIT	PAPER NUMBER
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2172

DATE MAILED: 02/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/919,186

Applicant(s)

TARDITI, DAVID R.

Examiner

Fred I. Ehichioya

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 December 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, with respect to claims 1 – 33, filed 11 December 2003 have been fully considered but they are not persuasive for the following reasons.

2. Applicant argues:

(a) "Examiner failed to establish a prima facie case of obviousness because the references fail to disclose or suggest all limitations of the pending claims. Specifically, Applicants assert that none of the references disclose any of the compact garbage collection tables as claimed by the Applicants" Page 2, Para 4).

(b) "None of the Bush references cited by the Examiner disclose any garbage collection" (Page 2, Para 5).

(c) "Bush does not disclose generating a first call site table storing call site identifiers as part of a computer process for building compact garbage collection tables adapted for use in reclaiming memory from a heap during runtime as claimed in claims 1, 11, 14, 24, 29 and 31" Page 3, Para 2).

(d) "The above section contains no reference to a table and certainly no reference to a table of unique descriptors" (Page 4, Para 2).

(e) "the card table does not map identifiers in one compact garbage collection table to descriptors in another compact garbage collection table and Gaithwaite does not anticipate this limitation of the independent claims" (Page 5, Para 2).

Examiner respectfully disagrees with all of the allegations as argued. Examiner, in his previous office action, gave detail explanation of claimed limitation and pointed out exact locations in the cited prior art.

In response to Applicant's argument (a): Prima facie case of obviousness is established when teachings of prior art appear to suggest claimed subject matter to person of ordinary skill in art; it is incumbent upon applicant to go forward with objective evidence of obviousness once prima facie case is established." *In re Rinehart* (CCPA) 189 USPQ 143 Decided Mar. 11, 1976 No. 75-608 U.S. Court of Customs and Patent Appeals. The combination of Bush's teaching of a facilitating garbage collection (see column 3, lines 35 – 45) and Garthwaite's teachings of garbage collector (see Abstract) clearly teaches Applicant's claimed invention.

In response to Applicant's argument (b): the recitation "garbage collection" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

In response to Applicant's argument (c): Examiner wants to point out that this rejection is 35 USC 103 rejections. Bush discloses call sites table as shown in column 4, lines 43 – 57 and Garthwaite discloses reclaiming memory heap as shown in column 5, lines 15 – 44. Examiner maintains that Combination of Bush's teaching and Garthwaite's teachings clearly suggest generating a first call site table storing call site identifiers as part of a computer process for building compact garbage collection tables adapted for use in reclaiming memory from a heap during runtime

In response to Applicant's argument (d): Examiner respectfully disagrees with the applicant. This rejection is 35 USC 103 rejections and that the applicant is attacking each reference individually. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Applicant only argues Bush reference. Descriptor is similar to an index entry in a table or book. Bush discloses table index as shown in column 8, lines 4 – 19 and Garthwaite discloses table index as disclosed in column 16, lines 20 – 38. Examiner maintains that Combination of Bush's teaching and Garthwaite's teachings clearly suggest applicant's claimed invention.

In response to Applicant's argument (e): Examiner respectfully disagrees with the applicant. Gaithwaite anticipates this limitation of the independent claims as discloses in

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column 8, line 64 thru column 9, line 45. Garthwaite maps the card tables to the trains, which are the garbage collection tables by association.

3. In view of the above, the examiner contends that all limitations as recited in the claims have been addressed in this Action. For the above reasons, Examiner believed that rejection of the last Office action was proper.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – 5, 11 – 15, 16 – 18, 24, 26, 29, 30, 31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,308,319 issued to William Bush et al (hereinafter "Bush") in view of U.S. Patent 6,185,581 issued to Alexander T. Garthwaite (hereinafter "Garthwaite").

Regarding claims 1, 11, 14, 24, 29 and 31, Bush teaches a computer program product encoding a computer program for executing on a computer system a computer process for building compact garbage collection tables adapted for use in reclaiming memory from a heap during runtime, the computer process comprising:

generating a first call site table storing call site identifiers (see column 4, lines 48 – 57);

generating a final descriptor table storing a set of unique descriptors, at least one unique descriptor describing a location of a pointer into the heap (see Fig.1 and column 4, lines 18 – 25); and

Bush does not explicitly teach generating a descriptor reference table associated with the first call site table, each entry in the descriptor reference table mapping a call site identifier in the first call site table to one of the unique descriptors in the final descriptor table.

Garthwaite teaches generating a descriptor reference table associated with the first call site table, each entry in the descriptor reference table mapping a call site identifier in the first call site table to one of the unique descriptors in the final descriptor table (see column Fig.6; column 7, lines 16 – 25, column 14, lines 63 – 67 and column 16, lines 20 - 38).

It would have been obvious to one of ordinary skills in the art at the time the invention was made to combine the teachings of Garthwaite with the teaching of Bush for descriptor table to include summary of its associated references to call site table. This enables the Garbage collector to consider which object is reachable and unreachable. As a result garbage collector is able to clear unusable memory.

Regarding claims 2, 12 and 15, Garthwaite teaches wherein at least two call site identifiers are mapped to the same unique descriptor in the final descriptor table (see column 6, lines 60 – 65 and column 12, lines 6 – 12).

Regarding claims 3, 13, 16, 26, 30 and 33, Garthwaite teaches the final descriptor table contains no identical descriptors (see column 12, lines 43 – 46).

Regarding claim 4 and 17, Garthwaite teaches the operation of generating a first call site table comprises: storing return addresses for one or more call sites into the call site table (see Fig.17a steps 180, 182, 184 and column 16, lines 5 – 32).

Regarding claims 5 and 18, Garthwaite teaches the operation of generating a final descriptor table comprises:

generating an initial descriptor table including at least two identical descriptors, each descriptor in the initial descriptor table corresponding with a call site identifier in the call site table (see column 12, lines 6 – 12);

copying each descriptor from the initial descriptor table to the final descriptor table, if the descriptor is not identical to another descriptor already copied to the final descriptor table (see column 12, lines 38 – 46).

5. Claims 6 – 10, 19 –23, 25, 27, 28 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bush in view Garthwaite in further in view of U.S. Patent 5,848,423 issued to Zahir Ebrahim et al (hereinafter “Ebrahim”).

Regarding claims 6 and 19, Bush teaches the operation of generating a descriptor reference table comprises:

generating a table pair including a second call site table and an initial descriptor table, the initial descriptor table storing descriptors that include at least two identical descriptors (see column 5, lines 53 - 60);

sorting the table pair based on the descriptors in the initial descriptor table to provide a sorted table pair (see column 4, lines 18 – 28);

Bush or Garthwaite does not explicitly teach traversing sequentially through the descriptors in the sorted table pair to associate a reference to each call site in the second call site table, the reference being modified when a unique descriptor is encountered in the initial descriptor table;

identifying each call site identifier in the second call site table to which each reference is associated; and storing each reference into the descriptor reference table in association with the call site identifier identified in the identifying operation.

However, Ebrahim teaches traversing sequentially through the descriptors in the sorted table pair to associate a reference to each call site in the second call site table, the reference being modified when a unique descriptor is encountered in the initial descriptor table (see column 4, lines 63 – 66);

identifying each call site identifier in the second call site table to which each reference is associated; and storing each reference into the descriptor reference table in association with the call site identifier identified in the identifying operation (see column 3, lines 40 – 42).

It would have been obvious to one of ordinary skills in the art at the time the invention was made to combine the teachings of Garthwaite and Ebrahim with the teaching of Bush for descriptor table to include summary of its associated references to call site table. This enables the Garbage collector to consider which object is reachable and unreachable. As a result garbage collector is able to clear unusable memory.

Regarding claims 7 and 20, Bush teaches the reference is an ordinal identifier of unique descriptors being processed during the traversing operation (see column 3, lines 47 – 50).

Regarding claims 8 and 21, Garthwaite teaches the traversing operation comprises: incrementing the ordinal identifier when a unique descriptor is encountered in the initial descriptor table (see column 15, lines 28 – 32).

Regarding claims 9, 22 and 28, Ebrahim teaches the reference includes a pointer one of the unique descriptors stored in the final descriptor table (see column 5, lines 41 – 44 and column 13, lines 4 – 11).

Regarding claims 10 and 23, Garthwaite teaches the traversing operation comprises:

designating as the reference a new pointer to one of the unique descriptors in the final descriptor table when a unique descriptor is encountered in the initial descriptor table (see column 10, lines 40 – 46).

Regarding claims 25 and 32, Ebrahim teaches the descriptor is mapped to at least two call site identifiers in the call site table (see column 13, lines 1 – 20).

Regarding claim 27, Ebrahim teaches the descriptor reference includes an index into the descriptor table (see column 9, lines 15 – 23).

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred I. Ehichioya whose telephone number is 703-305-8039. The examiner can normally be reached on M - F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Breene can be reached on 703-305-9790. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-303-3900.

Fred I. Ehichioya
Examiner
Art Unit 2172
February 9, 2004


SHAHID ALAM
PRIMARY EXAMINER